## DETAILED ACTION

### *Response to Amendment*

1. The amendments to the Claims, in the submission dated 5/7/08, are acknowledged and accepted.

### *Response to Arguments*

2. Applicant's arguments filed 5/7/08 have been fully considered but they are not persuasive. Applicants argue that the prior art cited does not disclose "making (N+1) levels of gradation exposure by the object beam with a single exposure time t1 given by dividing to by N, where to is an exposure time necessary for exposing an area of the recording layer corresponding to a single pixel of the data page as much as 100%, and N is an integer of not less than 2, and exposing the area as much as approximately 100% by exposure of N times, and as much as 0 by exposure of 0 times, and as much as over 0 and under 100% by exposure between 1 and (N-1) times. Applicants argue that the first exposure taught in Newswanger et al. is white light and the second exposure with the desired data. The Examiner respectfully disagrees. Newswanger et al. disclose embodiments with and without pre-illumination of the holographic recording material. Whether or not the holographic recording material is pre-illuminated, Tables 2-3 show that the holographic recording material can be exposed to the same pulsed laser-created interference pattern multiple times. As such, Newswanger et al. disclose N exposures or pulses ranging from 0-15, instead of only 1 as Applicants argue.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Newswanger et al. (6,806,982).

Consider claim 1, Newswanger et al. teach (e.g. figure 1) a holographic recording method for irradiating a layer of a holographic recording medium (RP, recording plate) with an object beam and a reference beam through an object optical system (130, object beam optical system) and a reference optical system (140, reference beam optical system) respectively, so that a data page is of interference fringes, the method comprising: exercising control so that the object beam in the object optical system is reflected in an exposure direction so as to be incident on the holographic recording medium or in a non-exposure direction so as not to be incident on the holographic medium selectively pixel by pixel in accordance with the data page to be recorded (by means of reflection type SLM); and making (N+1) levels of gradation exposure (multiple pulse exposure recording) with a single exposure time t1 given by dividing to by N, where to is an exposure time necessary for exposing an area of the recording layer corresponding to a single pixel of the data page as much as approximately 100% and N

is an integer of not less than 2; and exposing the area as much as approximately 100% by exposure of N times, as much as 0 by exposure of 0 times and as much as over 0 and under 100% by exposure of between 1 and (N-1) times [col. 6, lines 53-67, col. 7, lines 1-10, col. 8, lines 21-35, col. 9, lines 40-67, col. 10, lines 1-67, col. 11, lines 1-19].

Consider claim 2, Newswanger et al. teach (e.g. figure 1) a holographic recording method wherein the reflection of the beam in the exposure direction or in the non-exposure direction is controlled pixel by pixel using a micromirror device (reflection type SLM) having an array of micromirrors corresponding to the respective pixels of the data page [col. 9, lines 58-67, col. 10 lines 1-16]. The micromirrors being switchable and controllable (via a computer system not shown) in the direction of reflection is seen to be inherent in the prior art device.

Consider claims 3-4, Newswanger et al. teach (e.g. figure 1) a holographic recording method wherein the object beam is pulsed (110, pulsed laser) to make a pulsed exposure for the single exposure time t1 by means of a pulsed light emission from a light source of the object beam and the reference beam [col. 8, lines 44-67, col. 9, lines 1-33].

Consider claim 5, Newswanger et al. teach (e.g. figure 1) a holographic recording method wherein a beam intensity distribution of the object beam immediately before the reflection is divided into (N+1) levels of areas; and the number of times of exposure for the time t1 within the exposure time to is controlled with respect to each of the areas so that the object beam after the reflection has a generally-uniform beam intensity

distribution (multiple pulse exposure recording) [col. 6, lines 53-67, col. 7, lines 1-10, col. 9, lines 40-67, col. 11, lines 1-19].

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newswanger et al. (6,806,982) in view of Mui (2003/0117615).

Consider claim 6, Newswanger et al. disclose (e.g. figure 1) a holographic recording apparatus (100, hologram recorder) comprising: a laser light source (110, pulsed laser); a first polarizing beam splitter (C1, beam splitter cube) for splitting a laser beam from this laser light source into an object beam and a reference beam; an object optical system (130, object beam optical system) for introducing the object beam to a holographic recording medium (RP, recording plate); and a reference optical system (140, reference beam optical system) for introducing the reference beam to the holographic recording medium (RP, recording plate), wherein the object optical system includes: a second beam splitter (C2, beam splitter cube) for transmitting or reflecting the object beam; a reflection type spatial light modulator (SLM) capable of intensity-modulating the object beam transmitted through this second beam splitter with respect to each of pixels of a data page to be recorded, and reflecting it in an exposure direction toward the second beam splitter or in a non-exposure direction different thereto

selectively; the object beam reflected by the reflection type spatial light modulator and the second beam splitter interferes with the reference beam in the holographic recording medium, and the reflection type spatial light modulator is configured so that it is capable of at least N times of reflection within an exposure time to, where to is the exposure time necessary for exposing an area of the recording layer corresponding to a single pixel of the data page as much as approximately 100%, a single exposure time t1 is given by dividing to by N, and N is an integer of not less than 2 ; and exposing the area as much as approximately 100% by exposure of N times, as much as 0 by exposure of 0 times and as much as over 0 and under 100% by exposure of between 1 and (N-1) times [col. 6, lines 53-67, col. 7, lines 1-10, col. 8, lines 21-35, col. 9, lines 40-67, col. 11, lines 1-19]. However, Newswanger et al. do not disclose that the second beam splitter is a polarizing beam splitter or a quarter-wave plate is arranged on an optical path between the second polarizing beam splitter and the reflection type spatial light modulator. Newswanger et al. and Mui are related as holographic devices. Mui teaches (e.g. figure 3) a quarter-wave plate (46) arranged on an optical path between a polarizing beam splitter (48) and a reflection type spatial light modulator (44) [0027]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the apparatus of Newswanger et al. to include a quarter-wave plate and second polarizing beam splitter, as taught by Mui, in order to select the correct polarization to be used in the apparatus for holographic recording.

Consider claim 7, the modified Newswanger et al. reference discloses (e.g. figure 1 of Newswanger et al.) a holographic recording apparatus wherein the reflection type

spatial light modulator (SLM) is made of a micromirror device having an array of micromirrors corresponding to the respective pixels of the data page [col. 9, lines 58-67, col. 10, lines 1-16 of Newswanger et al.]. The micromirrors being switchable and controllable (via a computer system not shown) in the direction of reflection is seen to be inherent in the prior art device.

Consider claim 8, the modified Newswanger et al. reference discloses (e.g. figure 1) a holographic recording apparatus wherein the laser light source (110, pulsed laser) is capable of pulsed light emission with a specified pulse width [col. 8, lines 44-67, col. 9, lines 1-67, col. 11, lines 1-16 of Newswanger et al.]. However, the modified Newswanger et al. reference does not disclose that the light source is pulsed with a pulse width that is generally the same width as the single exposure time t1 of the reflection type spatial light modulator. Note that the Court has held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation; see **In re Aller, 220 F.2d 454, 456, 105 USPQ 223, 235**. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to set the pulse width to be the same width as a single exposure time t1 to the reflection type spatial light modulator, in order to increase the diffraction efficiency of recorded holograms.

7. Claims 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newswanger et al. (6,806,982) in view of Mui (2003/0117615) as applied to claims 6 and 8 above, and further in view of Long (2001/0013959).

Consider claim 9, the modified Newswanger et al. reference does not disclose beam interrupting means for transmitting laser light with generally the same pulse width as the single exposure time t1 of the reflection type spatial light modulator and interrupting it between pulses is interposed between the laser light source and the first polarizing beam splitter. Newswanger et al., Mui and Long are related as holographic devices. Long teaches (e.g. figures 1, 7) beam interrupting means (52, shutter) means for transmitting laser light with generally the same pulse width as the single exposure time t1 of the reflection type spatial light modulator and interrupting it between pulses is interposed between the laser light source and the first polarizing beam splitter [0045-0046, 0056, 0084-0085]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of the modified Newswanger et al. reference to include beam interrupting means, as taught by Long, in order to accurately shape the light beam pulse used for holographic recording to increase the efficiency of the device.

Consider claims 10-12, the modified Newswanger et al. reference discloses (e.g. figures 1, 7 of Long) a holographic recording apparatus comprising a control unit (52, shutter and computer of Long) for controlling the number of times of exposure within the exposure time to with respect to each of the pixels of the reflection type spatial light modulator, and wherein the control unit is configured to control the number of times of exposure within the exposure time to pixel by pixel so that a beam intensity distribution after the reflection by the reflection type spatial light modulator becomes generally

uniform (by multiple pulse exposure recording of Newswanger et al.) [0045-0046, 0056, 0084-0085 of Long; col.6, lines 53-67, col. 7, lines 1-10 of Newswanger et al.].

Consider claims 13-15, the modified Newswanger et al. reference discloses (e.g. figures 1-7 of Long) a holographic recording apparatus wherein the control unit (52, shutter and computer) is configured to control the number of times of exposure so that the object beam after the reflection becomes generally uniform in intensity, based on beam intensity distribution information on each area when the beam intensity distribution of the object beam immediately before incident on the reflection type spatial light modulator is divided into (N+1) levels of areas (by means of multiple pulse exposures of Newswanger et al.) [0045-0046, 0056, 0084-0085 of Long].

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JADE CALLAWAY whose telephone number is (571)272-8199. The examiner can normally be reached on Monday to Friday 7:00 am - 4:30 pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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